Easy PLC *micro*

User Manual

WARNING!

The Easy PLC has been designed for use in multiple applications. It is practically impossible to test the performance, or assess the suitability of the Easy PLC, in any or all of them.

Please assess the suitability of using the Easy PLC micro for your application before using it. We will not be responsible in any way for any results, which you may achieve by using the Easy PLC micro either correctly or incorrectly.

Be careful while downloading the program to the Easy PLC micro which is connected to a machine which is powered up. The download could trigger an erratic operation which can be dangerous to equipment and personnel.

The Easy PLC Programmer software has been developed as an aid for programming the Easy PLC but has not been extensively tested or debugged. The syntax and error detection capabilities have not been ascertained rigorously. Kindly follow the syntax of statements as shown in the manual to prevent errors.

Incorrect use of Easy PLC micro can result in damage to equipment, machinery and/or personnel. Be careful! Easy PLC micro and other PLCs from the family are recommended to be used by trained personnel only for real life applications.

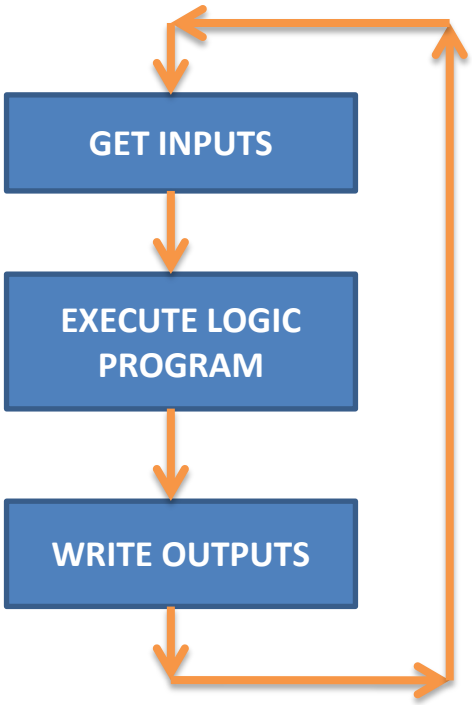
EASY PLC *micro*

Specifications:

- ✓ Power Supply: 24VDC +/- 10% @250mA
- ✓ 5 Digital Inputs – 24 VDC (Logic 0 = 0 to 12VDC, Logic 1 = 18VDC to 30VDC)
  (2 High Speed Inputs for counting or encoder feedback – not tested/implemented)
- ✓ 4 Digital 24VDC / Analog Inputs 0-10VDC (13 bits resolution with DRE technology)
- ✓ 6 Digital Outputs 24VDC @0.5A / Optional 4A can directly drive solenoid valves
  Sink Type – Open Collector. Free Wheeling Diodes for inductive loads built in.
  (2 PWM outputs, can drive proportional valves, 1 PTO output for servo drive – not tested /implemented)
- ✓ 256 Memory Flags (240 General Purpose + 16 special Flags)
- ✓ 64 Timers (0.1 sec to 3276.7 sec) / Counters (0 to 32767)
- ✓ 128 Datawords for storage of parameter values / 64 datawords for temporary data
- ✓ 32 Messages for display of 16 characters each
- ✓ 64 subroutines with nesting depth of 8 routines
- ✓ Cycle time 4.6 milliseconds / 1000 statements approximately
- ✓ 2000 statements Program Memory
- ✓ Built in HMI – 16x2 LCD display + 16 key Keyboard
- ✓ 8 keys PB1 to PB8 can be used in PLC program
- ✓ Information display for status of Inputs and Outputs
- ✓ 1 x RS232 / RS485 port for interface to PC

Execution Structure:

The Easy PLC like almost all other PLCs operates in an infinite loop which has the following form.



The PLC reads all inputs. Then executes the logic program and generates outputs which are stored in the outputs image in the PLC memory. The outputs image is then dumped on to the terminals in the third and final step. The program execution loops back and executes the process infinitely.

Instructions:

Note:
In the following, element is the name of INPUT, OUTPUT, FLAG, TIMER, COUNTER, DATAWORD, SUBROUTINE, MESSAGE, ANALOGINPUT or ANALOGOUTPUT except as noted.

Assignment Statements:

element IS INPUT n (0-8)
For e.g. START_PB IS INPUT 3

element IS OUTPUT n (0-5)
For e.g. FWD_SOL IS OUTPUT 1

element IS FLAG n (0-239)
For e.g. SEMIAUTO_MODE IS FLAG 36

element IS TIMER n (0-63)
For e.g. COOLING_TIMER IS TIMER 24

element IS COUNTER n (0-63)
For e.g. NO_OF_PIECES IS COUNTER 10

element IS DATAWORD n (0-191) VALUE n FORMAT $$$$$
n = -32768 to 32767
$$$$$ = XXXXX or XXXX.X or XXX.XX or XX.XXX or X.XXXX or .XXXXX
Value of datawords 0 to 127 is retained in Power off condition and hence should be used for storing set values and timer values. The value of datawords 128 to 191 is not retained in Power Off condition and hence should be used to store intermediate and final results of calculations during scaling and other functions.
For e.g. COOLING_TIME IS DATAWORD 24 VALUE 300 FORMAT XXXX.X (cooling time of 30.0 secs)

element IS SUBROUTINE n (0-63)
For e.g. MANMODE_RTN IS SUBROUTINE 3

element IS MESSAGE n (0-31) VALUE ccccccccccccccc (16 chars)
For e.g. IUF_MSG IS MESSAGE 15 VALUE INJ_UNIT_FORWARD

element IS ANALOGINPUT n (0-3)
For e.g. MOLD_POS IS ANALOGINPUT 0

element IS ANALOGOUTPUT n (0-1)
For e.g. FLOW IS ANALOGOUTPUT 1

Note: Spaces are not allowed in Parameter names and messages. Use hyphen. It is displayed as space character

Program Statements:

- ✓ IF *element* ON
- ✓ IF *element* OFF
- ✓ IF *element* RISINGEDGE for inputs only
- ✓ IF *element* FALLINGEDGE for inputs only

- ✓ AND *element* ON
- ✓ AND *element* OFF
- ✓ AND *element* RISINGEDGE for inputs only
- ✓ AND *element* FALLINGEDGE for inputs only

- ✓ OR *element* ON
- ✓ OR *element* OFF
- ✓ OR *element* RISINGEDGE for inputs only
- ✓ OR *element* FALLINGEDGE for inputs only

- ✓ AND BLOCK
- ✓ OR BLOCK

Note:
Every 'IF' statement starts a new block. 'AND BLOCK' logically ANDs the result of the last block with the result of the block just before that. Similarly, 'OR BLOCK' logically ORs the result of the last block with result of the block just before that. A maximum of nine IF statement blocks can be used before using 'AND BLOCK' or 'OR BLOCK' or else the result of the first block will be lost.

- ✓ THEN *element* ON for outputs / flags
- ✓ THEN *element* OFF for outputs / flags

- ✓ SET *element* for outputs / flags
- ✓ RESET *element* for outputs / flags

- ✓ CALL *element* IFTRUE
- ✓ CALL *element* IFFALSE
- ✓ CALL *element*
- ✓ RETURN

- ✓ START *element* TIMER
- ✓ RESET *element* for timers

Note:
Before using the START Timer instruction, load the timer value in the accumulator. Timer values are stored in the datawords numbered 0 to 127. All timers have a resolution of 0.1 seconds hence a value of 107 indicates a time value of 10.7 seconds. For e.g.

```
*       Assignments

DECOMPRESSION IS FLAG 30

COOLTIME IS DATAWORD 10 VALUE 100 FORMAT XXXX.X
COOLING_TIMER IS TIMER 21

* Program

IF DECOMPRESSION ON
LOAD COOLTIME
START COOLING_TIMER TIMER
```

- ✓ SET *element* COUNTER
- ✓ INCREMENT *element*
- ✓ DECREMENT *element*

- ✓ LOAD *element* COUNTER for counter values
- ✓ LOAD *element* for data words

- ✓ STORE *element* for data words

- ✓ READ *element* for analog inputs
- ✓ STORE *element* for analog outputs

- ✓ COMPARE IF EQUAL
- ✓ COMPARE IF NOTEQUAL
- ✓ COMPARE IF GREATER
- ✓ COMPARE IF GREATEROREQUAL
- ✓ COMPARE IF LESS
- ✓ COMPARE IF LESSOREQUAL

- ✓ ADD
- ✓ SUBTRACT
- ✓ MULTIPLY
- ✓ DIVIDE

Note:
Load first dataword, Load second dataword, Comparison is always done of first dataword with second dataword. Numeric operation follows the same order. For e.g.

LOAD DW1
LOAD DW2
COMPARE IF GREATEROREQUAL

The above statements check if DW1 >= DW2 and the RLO (Result of Logic Operation) is updated accordingly.

LOAD DW1
LOAD DW2
SUBTRACT

The accumulator holds the result of DW1 – DW2.

LOAD DW1
LOAD DW2
DIVIDE

The accumulator holds the result of DW1 / DW2.

- ✓ PWM ON
- ✓ PWM OFF

- ✓ PTO ON not currently implemented
- ✓ PTO OFF not currently implemented

- ✓ SUBROUTINE *element* for subroutines only

- ✓ DISPLAY *element* for messages only

- ✓ END PROGRAM
- ✓ END FILE

Program Structure:

All assignment statements are entered first, followed by program statements. After the logic program is entered it must be followed by END PROGRAM statement which indicates end of the logic program. Following the END PROGRAM statement, write all the subroutines. Each subroutine ends with a RETURN statement. The last instruction in the program must be the END FILE statement which indicates the end of the entire program. The structure of the program is indicated below.

Note:
All lines beginning with asterisk '*' are treated as comments and are ignored.

```
*       Assignment Statements
.
.
.
*       Program Statements
.
.
.
END PROGRAM

SUBROUTINE element
.
.
.
RETURN

SUBROUTINE element
.
.
.
RETURN

END FILE
```

Template File

A template file has been provided with predefined names for all Inputs, Outputs, Flags, Timers/Counters, Subroutines, Messages, Data words, Analog Inputs Analog Outputs and all the special flags defined in the EasyPLC. This file should be copied and pasted into new application program and the names changed as per the requirements of the application. Unwanted names may be retained or may be dropped. This will make the job of developing the applications easier.

Programming Examples

Subroutine Test

* Subroutine Test Program

```
* The program toggles two outputs M1 and M2. When M1 is ON the program calls
* subroutine 1 and when M2 is ON it calls subroutine 2. Subroutine 1 displays message
* "Subroutine 1" and subroutine 2 displays message "Subroutine 2"

* Define Outputs
M1 IS OUTPUT 1
M2 IS OUTPUT 2

* Define timer values M0_TIME is not used
M0_TIME IS DATAWORD 0 VALUE 256 FORMAT XXXX.X
M1_TIME IS DATAWORD 1 VALUE 10 FORMAT XXXX.X
M2_TIME IS DATAWORD 2 VALUE 10 FORMAT XXXX.X

* Define Timers
M1_TIMER IS TIMER 1
M2_TIMER IS TIMER 2

* Define Subroutines
MODE1_RTN IS SUBROUTINE 1
MODE2_RTN IS SUBROUTINE 2

* Define messages
SUB1_MSG IS MESSAGE 1 VALUE SUBROUTINE_1
SUB2_MSG IS MESSAGE 2 VALUE SUBROUTINE_2

* Switch ON output M1
IF M1 OFF
AND M2 OFF
SET M1

IF M1 ON
LOAD M1_TIME
START M1_TIMER
CALL MODE1_RTN IFTRUE

IF M1 ON
AND M1_TIMER ON
RESET M1
SET M2

IF M2 ON
LOAD M2_TIME
START M2_TIMER
CALL MODE2_RTN IFTRUE

IF M2 ON
AND M2_TIMER ON
RESET M2
SET M1

END PROGRAM
```

```
SUBROUTINE MODE1_RTN
IF M1 ON
DISPLAY SUB1_MSG
RETURN

SUBROUTINE MODE2_RTN
IF M2 ON
DISPLAY SUB2_MSG
RETURN

END FILE
```

Scaling

```
*       Program for scaling of analog input. Input 0 is connected to a Pressure
*       Transducer giving 0-10VDC for a pressure range of 0-250.0 bar. The
*       Signal is simulated by pressing keys PB1 to PB8.
*       0-10VDC is converted by the PLC to 0-8191 counts.
*       PB1 sets the current pressure value to 1000 counts, PB2 = 2000 counts,
*       PB3 = 3000, PB4 = 4000, PB5 = 5000, PB6 = 6000, PB7 = 7000, PB8 = 8000
*       Formula Pressure = y = Y2 – (Y2-Y1)*(X2-x)/(X2-X1) where y is current pressure value
*       x is current reading in counts. X1=0, X2=8191, Y1=0, Y2=2500
*       Format for PRESSURE is XXXX.X

*       PRESS_VAL IS ANALOGINPUT 0

* Push Button Assignments

PB1 IS FLAG 240
PB2 IS FLAG 241
PB3 IS FLAG 242
PB4 IS FLAG 243
PB5 IS FLAG 244
PB6 IS FLAG 245
PB7 IS FLAG 246
PB8 IS FLAG 247

* DATAWORDS

X1_DATA IS DATAWORD 0 VALUE 0 FORMAT XXXXX
X2_DATA IS DATAWORD 1 VALUE 8191 FORMAT XXXXX
Y1_DATA IS DATAWORD 2 VALUE 0 FORMAT XXXX.X
Y2_DATA IS DATAWORD 3 VALUE 2500 FORMAT XXXX.X
PB1_DATA IS DATAWORD 4 VALUE 1000 FORMAT XXXXX
PB2_DATA IS DATAWORD 5 VALUE 2000 FORMAT XXXXX
PB3_DATA IS DATAWORD 6 VALUE 3000 FORMAT XXXXX
PB4_DATA IS DATAWORD 7 VALUE 4000 FORMAT XXXXX
PB5_DATA IS DATAWORD 8 VALUE 5000 FORMAT XXXXX
PB6_DATA IS DATAWORD 9 VALUE 6000 FORMAT XXXXX
PB7_DATA IS DATAWORD 10 VALUE 7000 FORMAT XXXXX
PB8_DATA IS DATAWORD 11 VALUE 8000 FORMAT XXXXX

* THE FOLLOWING ARE READ WRITE DWORDS AND THEIR VALUES
* ARE NOT STORED DURING POWER OFF. THESE WORDS ARE
* TO BE USED FOR CALCULATIONS WHERE ONLY THE CURRENT
* VALUE IS REQUIRED. FOR EG. IN SCALING ANALOG INPUT


PRESSURE IS DATAWORD 128 VALUE 0 FORMAT XXXX.X
Y2Y1DIFF IS DATAWORD 129 VALUE 0 FORMAT XXXXX
X2X1DIFF IS DATAWORD 130 VALUE 0 FORMAT XXXXX
CURRDIFF IS DATAWORD 131 VALUE 0 FORMAT XXXXX
TMP_PROD IS DATAWORD 132 VALUE 0 FORMAT XXXXX
SUBTRAD IS DATAWORD 133 VALUE 0 FORMAT XXXXX
CURR_RDG IS DATAWORD 134 VALUE 0 FORMAT XXXXX

* MESSAGES
* VALUES ARE MESSAGES TO BE DISPLAYED ON LCD
* MAX OF 16 CHARS ALLOWED "_" WILL BE DISPLAYED AS SPACE

PB1_MSG IS MESSAGE 0 VALUE PB1_PRESSED_____
PB2_MSG IS MESSAGE 1 VALUE PB2_PRESSED_____
PB3_MSG IS MESSAGE 2 VALUE PB3_PRESSED_____
PB4_MSG IS MESSAGE 3 VALUE PB4_PRESSED_____
```

```
PB5_MSG IS MESSAGE 4 VALUE PB5_PRESSED_____
PB6_MSG IS MESSAGE 5 VALUE PB6_PRESSED_____
PB7_MSG IS MESSAGE 6 VALUE PB7_PRESSED_____
PB8_MSG IS MESSAGE 7 VALUE PB8_PRESSED_____

* PROGRAM STARTS HERE

IF PB1 ON
LOAD PB1_DATA
STORE CURR_RDG
DISPLAY PB1_MSG

IF PB2 ON
LOAD PB2_DATA
STORE CURR_RDG
DISPLAY PB2_MSG

IF PB3 ON
LOAD PB3_DATA
STORE CURR_RDG
DISPLAY PB3_MSG

IF PB4 ON
LOAD PB4_DATA
STORE CURR_RDG
DISPLAY PB4_MSG

IF PB5 ON
LOAD PB5_DATA
STORE CURR_RDG
DISPLAY PB5_MSG

IF PB6 ON
LOAD PB6_DATA
STORE CURR_RDG
DISPLAY PB6_MSG

IF PB7 ON
LOAD PB7_DATA
STORE CURR_RDG
DISPLAY PB7_MSG

IF PB8 ON
LOAD PB8_DATA
STORE CURR_RDG
DISPLAY PB8_MSG

*       Use the following 3 lines for using the actual Analog Input 0
*       instead of the push buttons simulation program above

*       IF ALWAYS_1 ON
*       READ    PRESS_VAL
*       STORE CURR_RDG

IF ALWAYS_1 ON
LOAD Y2_DATA
LOAD Y1_DATA
SUBTRACT
STORE Y2Y1DIFF

IF ALWAYS_1 ON
LOAD X2_DATA
LOAD X1_DATA
```

```
SUBTRACT
STORE X2X1DIFF

IF ALWAYS_1 ON
LOAD X2_DATA
LOAD CURR_RDG
SUBTRACT
STORE CURRDIFF

IF ALWAYS_1 ON
LOAD Y2Y1DIFF
LOAD CURRDIFF
MULTIPLY
LOAD X2X1DIFF
DIVIDE
STORE SUBTRAD

IF ALWAYS_1 ON
LOAD Y2_DATA
LOAD SUBTRAD
SUBTRACT
STORE PRESSURE

END PROGRAM

END FILE
```

Sequence Test

```
*       Many automated machines follow the sequential mode, where different operations
*       are performed in sequential steps. At each step, a set of outputs may be switched ON
*       or OFF. The end of a step is generally decided by an Input or end of a timer.
*       The program is self-documentary, which is an important feature of CLARITY language
*       The program can be written in upper or lower case. The compiler converts everything
*       to upper case while processing

step1 is flag 1
step2 is flag 2
step3 is flag 3
step4 is flag 4
step5 is flag 5
continue is flag 6

start is flag 240

st0 is output 0
st1 is output 1
st2 is output 2
st3 is output 3
st4 is output 4
st5 is output 5

Torqk is dataword 0 value 2500 format xx.xxx

s1timer is timer 1
s1_time is dataword 1 value 20 format xxxx.x

s2timer is timer 2
s2_time is dataword 2 value 20 format xxxx.x

s3timer is timer 3
s3_time is dataword 3 value 20 format xxxx.x

s4timer is timer 4
s4_time is dataword 4 value 20 format xxxx.x

s5timer is timer 5
s5_time is dataword 5 value 20 format xxxx.x

cycles is dataword 6 value 3 format xxxxx
cyc_counter is counter 6

s1msg is message 1 value ARM_FORWARD
s2msg is message 2 value MEASURE_TORQUE
s3msg is message 3 value MEASURE_ANGLE
s4msg is message 4 value ARM_REVERSE
s5msg is message 5 value ARM_HOME_POS
WAITMSG IS MESSAGE 0 VALUE WAIT_FOR_START

*       Program starts here

IF  ST1 OFF
AND ST2 OFF
AND ST3 OFF
AND ST4 OFF
AND ST5 OFF
DISPLAY WAITMSG
```

```
if start on
load cycles
set cyc_counter counter
reset continue

IF START ON
or continue on
AND ST1 OFF
AND ST2 OFF
AND ST3 OFF
AND ST4 OFF
AND ST5 OFF
SET ST1
reset continue
DISPLAY S1MSG

IF ST1 ON
LOAD S1_TIME
START S1TIMER

IF ST1 ON
AND S1TIMER ON
RESET ST1
SET ST2
DISPLAY S2MSG

IF ST2 ON
LOAD S2_TIME
START S2TIMER
IF ST2 ON
AND S2TIMER ON
RESET ST2
SET ST3
DISPLAY S3MSG

IF ST3 ON
LOAD S3_TIME
START S3TIMER

IF ST3 ON
AND S3TIMER ON
RESET ST3
SET ST4
DISPLAY S4MSG

IF ST4 ON
LOAD S4_TIME
START S4TIMER

IF ST4 ON
AND S4TIMER ON
RESET ST4
SET ST5
DISPLAY S5MSG

IF ST5 ON
LOAD S5_TIME
START S5TIMER

IF ST5 ON
AND S5TIMER ON
RESET ST0
RESET ST1
```

```
RESET ST2
RESET ST3
RESET ST4
RESET ST5
decrement cyc_counter

if cyc_counter on
and s5timer on
set continue

END PROGRAM
END FILE
```

Simple GATES demo

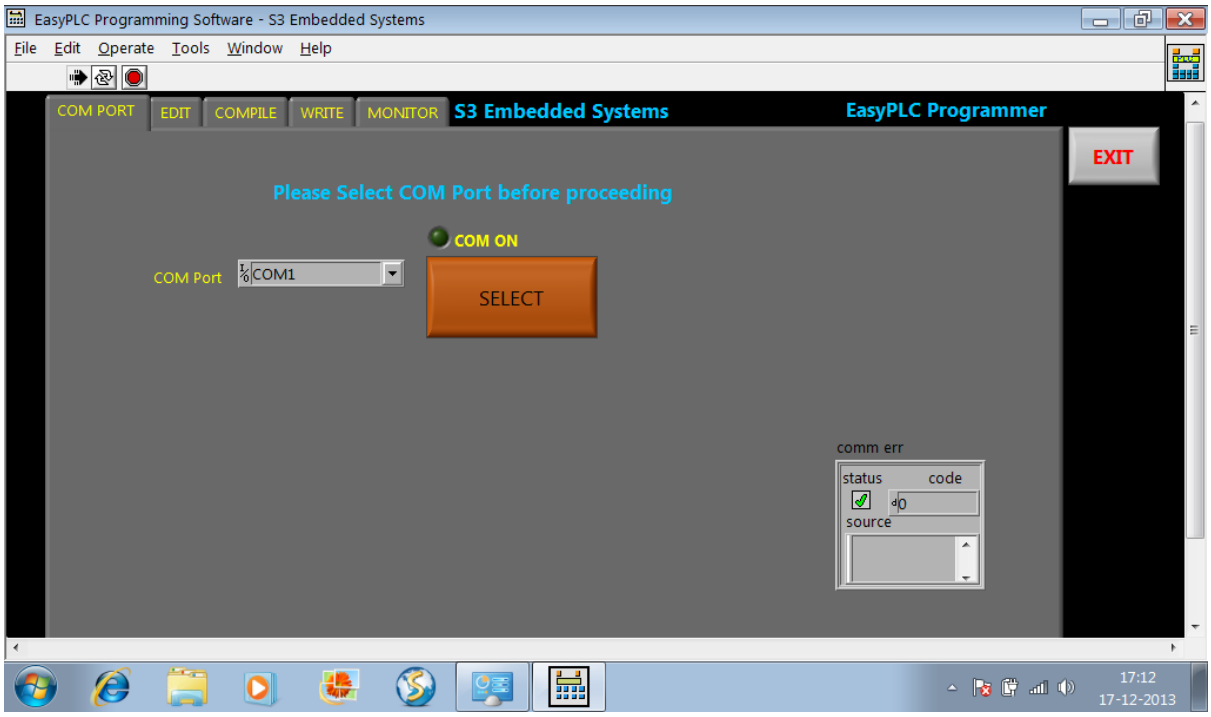
```
* Sample test program to demonstrate simple functions
* program segment 1 - a,b,c,d... are part of this single large program.
* All inputs, outputs, flags, timers, counters, datawords must be
* assigned before they are used in the program.
* program segment 1a - AND  gate
* program segment 1b - OR   gate
* program segment 1c - NOT  gate
* program segment 1d - NAND gate
* program segment 1e - NOR  gate
* program segment 1f - XOR  gate
* program segment 1g - XNOR gate
* program segment 1h - Buffer/Follower
*****************************************************************
* program segment - 1a
* AND gate. If Input 0 AND Input 1 are On then output 0 is ON
*****************************************************************
inp0 is input 0
inp1 is Input 1

out0 is output 0

if      inp0    on
and     inp1    on
then    out0    on

*****************************************************************
* program segment - 1b
* OR gate. If Input 2 OR Input 3 are On then output 1 is ON
*****************************************************************
inp2 is input 2
inp3 is Input 3

out1 is output 1

if      inp2    on
or      inp3    on
then    out1    on

*****************************************************************
* program segment - 1c
* NOT gate. If Input 4 is OFF then output 2 is ON and vice-versa.
*****************************************************************
inp4 is input 4

out2 is output 2

if      inp4    off
then    out2    on

*****************************************************************
* program segment - 1d
* NAND gate. If Input 5 AND Input 6 are On then output 3 is OFF
* else it is ON
*****************************************************************
inp5 is input 5
inp6 is Input 6

out3 is output 3
```

```
if      inp5    on
and     inp6    on
then    out3    off

*****************************************************************
* program segment - 1e
* NOR gate. If Input 7 OR Input 8 are On then output 4 is OFF
*****************************************************************
inp7 is input 7
inp8 is Input 8

out4 is output 4

if      inp7    on
or      inp8    on
then    out4    off

*****************************************************************
* program segment - 1f
* XOR gate. If Input 9 AND Input 10 have the same state i.e. both
* are ON or both are OFF, then output 5 is OFF else it is ON.
*****************************************************************
inp9 is input 9
inp10 is Input 10

out5 is output 5

if      inp9    on
and     inp10   off

if      inp9    off
and     inp10   on

or      block
then    out5    on

*****************************************************************
* program segment - 1g
* XNOR gate. If Input 11 OR Input 12 have the same state i.e. both
* are ON or both are OFF, then output 6 is ON else it is OFF.
*****************************************************************
inp11 is input 11
inp12 is Input 12

out6 is output 6

if      inp11   on
and     inp12   on

if      inp11   off
and     inp12   off

or      block
then    out6    on

*****************************************************************
* program segment - 1h
* Buffer or Follower gate. If Input 13 is ON then output 7 is ON
* and vice-versa.
*****************************************************************
inp13 is input 13

out7 is output 7
```

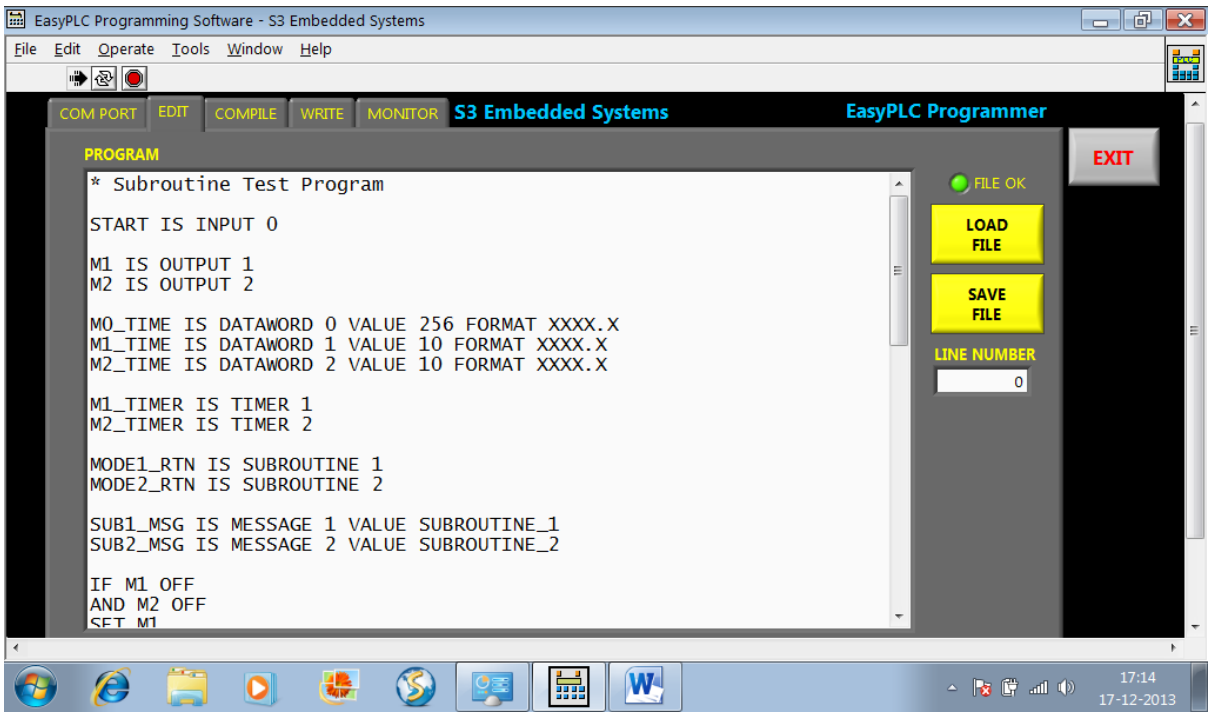
```
if      inp13   on
then    out7    on

end     program
end     file
```

Programming Software

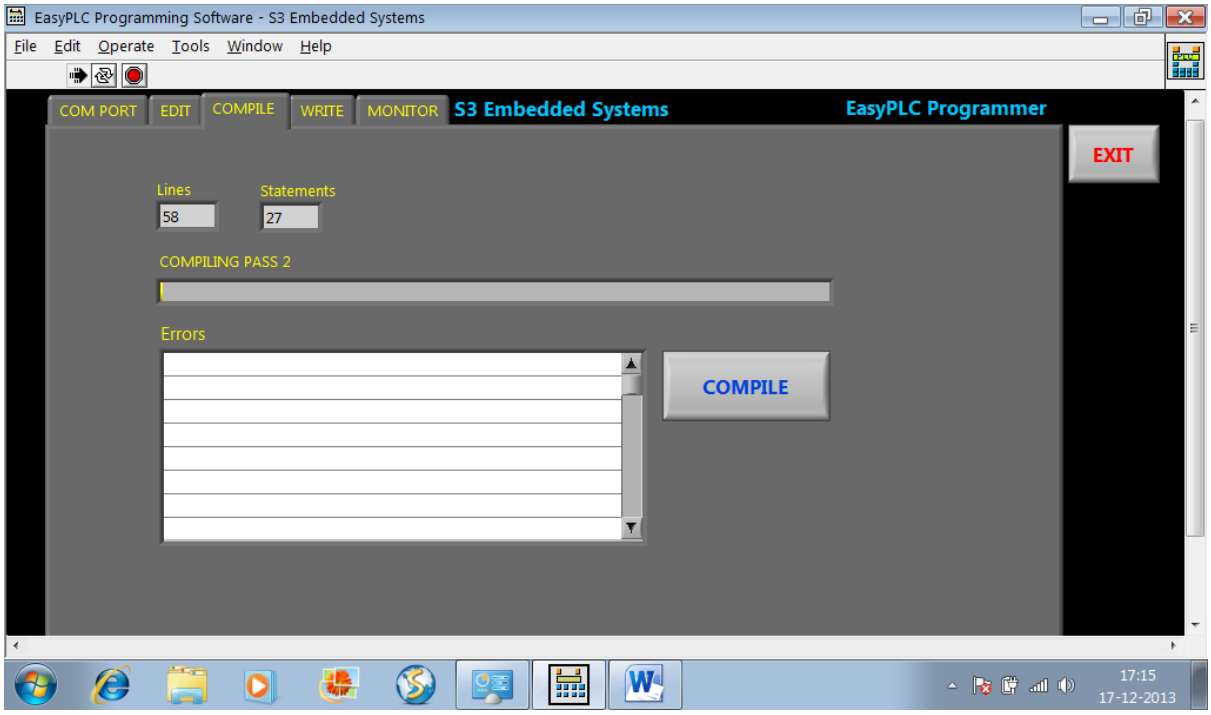
Write the PLC program in Notepad or similar editor and store it as a simple text file.
To program the Easy PLC micro, run the Easy PLC Programmer software and follow the steps below. One the first page, choose a COM Port of your PC using the drop down list box and pressing SELECT button. There must be no error the "comm err" box.



Go to the next page (TAB) and press the LOAD FILE button to load the file. Any final editing if required can be done here. Remember to save the file if changed using the SAVE FILE button.



Go to compile page (TAB) and press the compile button to compile the program. Errors if any will be shown in the "Errors" box below. Also, the line containing errors will be highlighted in RED in loaded file on the EDIT page and focus will shift to the last line containing the error.



Once the program is error-free then, go to the WRITE page and press the WRITE button to write the logic program to the PLC memory. This overwrites the earlier program in the PLC. Also ensure that the PLC is connected to the PC using cable provided for the purpose.

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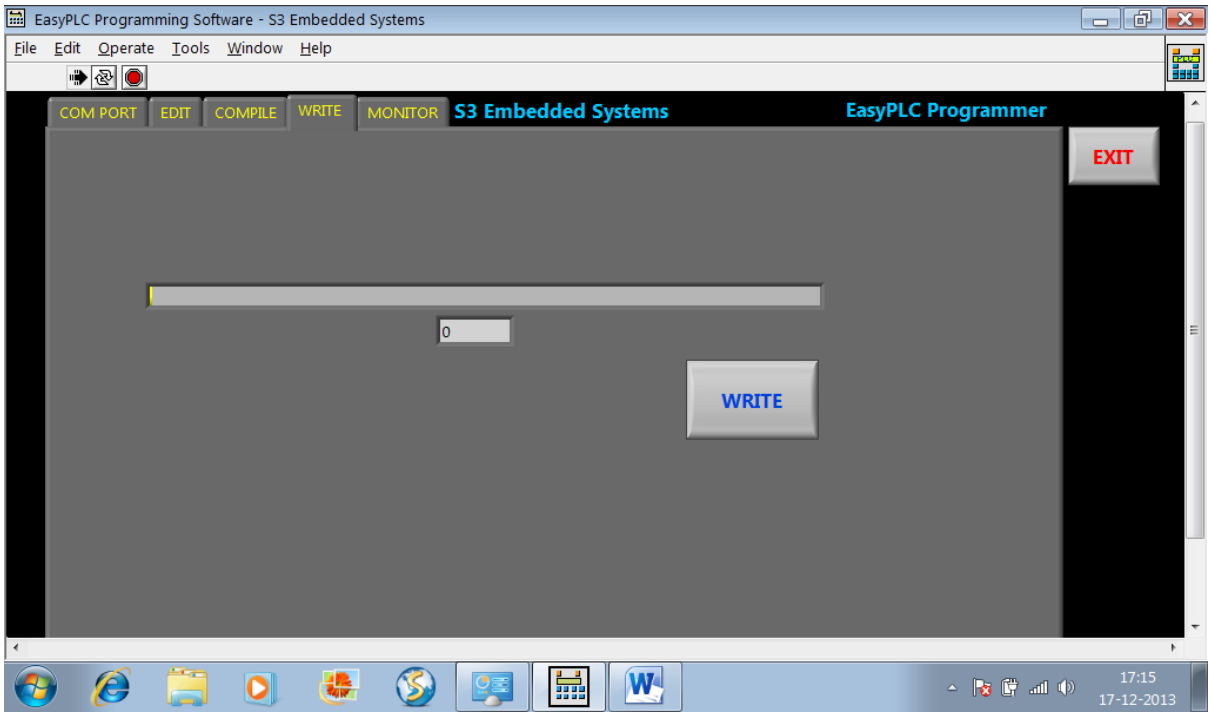
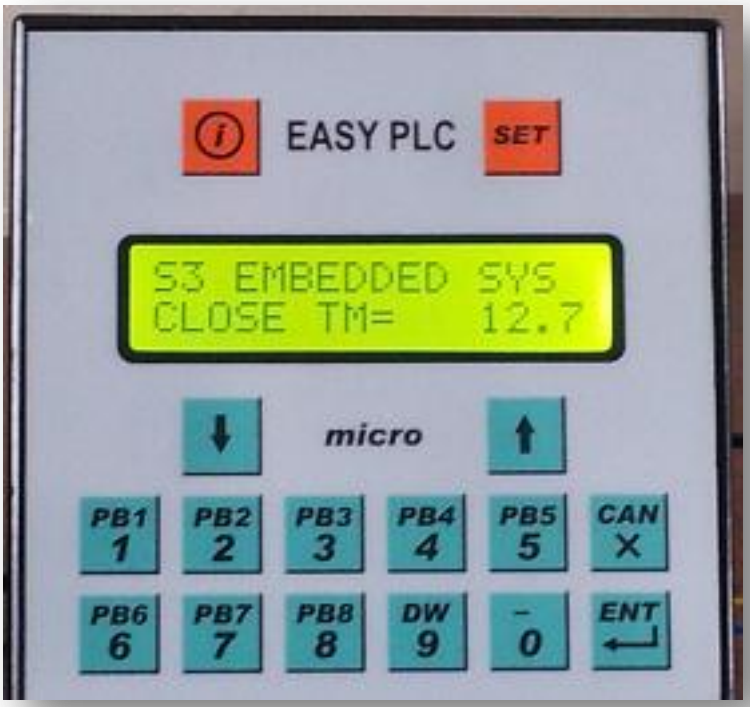


Once the program has been downloaded then monitor and debug the program using the MONITOR page and pressing the MON ON button. Before leaving the page, kindly ensure that the MONITOR mode is switched OFF using the MON OFF button. Pressing EXIT will exit the Easy PLC Programmer software.

Easy PLC micro can be put in RUN mode or STOP mode and can be RESET using the buttons provided for the purpose. DATAWORD values can also be changed using the controls provided for the purpose. To RUN, STOP and RESET the PLC the Monitoring mode must be ON. The MONitor mode ON is indicated by a green lamp named MON as shown in the image below. RESET PLC works only when the PLC is in STOP mode. To RESET PLC first press STOP button once and then press the RESET button once. PLC can then be put in RUN mode. The FIRST_SCAN flag (Flag 253) is ON after this software RESET.

Easy PLC Front Panel Keypad Operation



The Easy PLC front panel has a 16 key keypad. The various keys on the front panel and their functions are as follows:

i Key – The "i" key is the information key. It toggles the display between the normal mode display and the status display. The status display, displays the state of all the inputs and outputs. This helps in debugging an application and aids in fault finding and diagnostics on a machine.

SET key – The SET key is used for setting the values of Data words. To change the value of a data word, please use UP and DOWN keys to display the data word and then press the SET key. This changes the mode of keypad to "edit mode". In this mode PB1 to PB8 work as numeric keys 1 to 8. The "edit mode" can be ended only by pressing either the CAN key or the ENT key. CANcel key restores the original value of the data word and ENTer key stores the new value of the data word.

UP and DOWN arrow keys – The UP and DOWN arrow keys are used to scroll UP and DOWN through the list of data words from 0 to 191. By pressing the UP or DOWN arrow key continuously the data words are scrolled in up and down direction till it reaches either data word 0 or data word 191.

PB1-1 to PB8-8 keys – The PB1 to PB8 keys function as Push Button keys in the normal mode and function as numeric keys 1 to 8 in the "edit mode". Multiple key presses are not allowed. A key has to be released before another key can be recognized. So PB1 to PB8 work like Push-to-ON push buttons with NO contact. The state of the keys PB1-PB8 is represented in the PLC as flags 240-247 respectively.

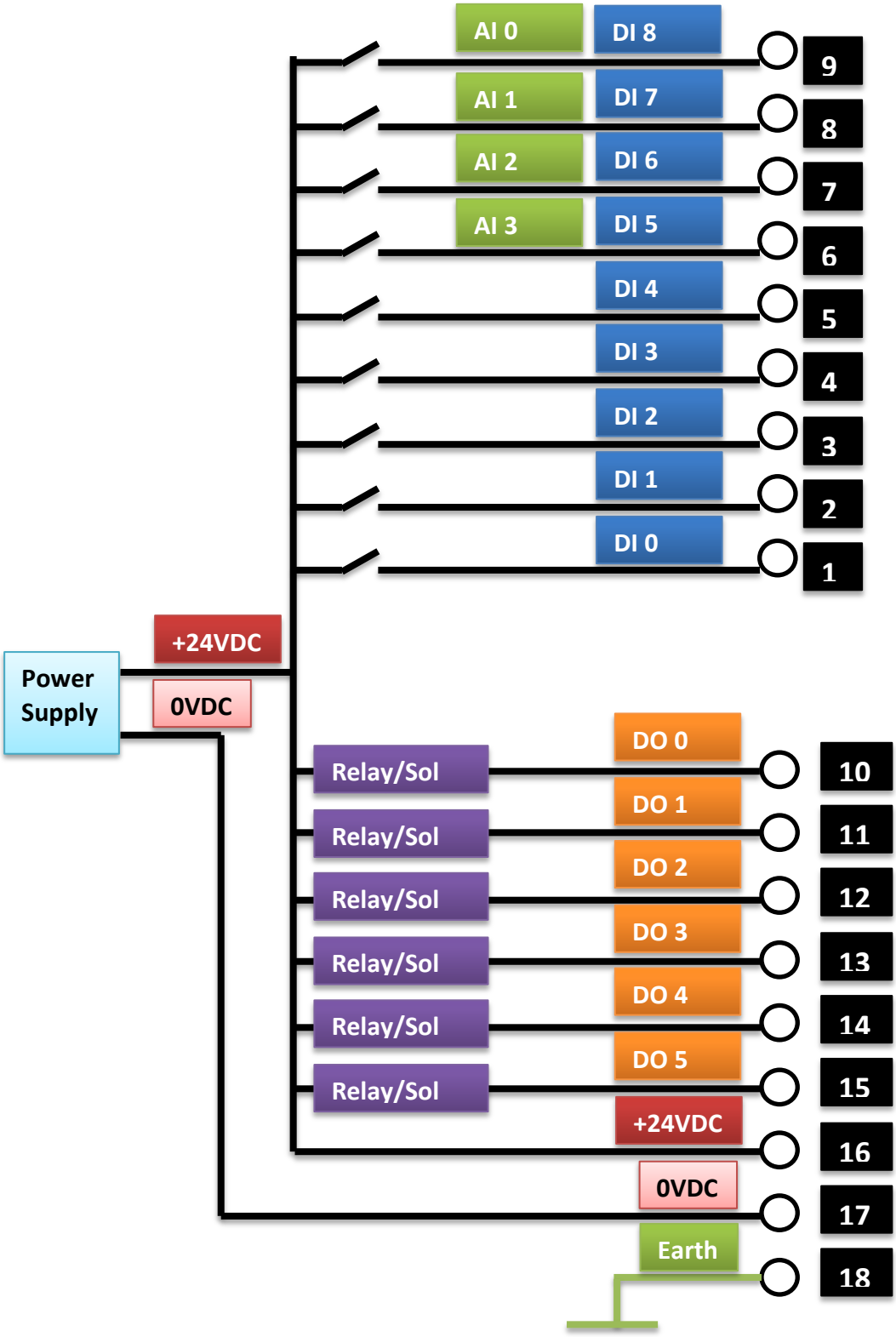
DW-9 Key – The DW-9 key is used to display a particular Data word in the display. Press DW key once and display asks for the data word number. Use the numeric keypad to enter number from 0 to 191 and then press the ENTer key to display that data word. In the "edit mode" this key functions as numeric key 9.

- or 0 Key – The "minus" or "-" key works only in the "edit mode". Pressing the key first in the "edit mode" signals the entry of a negative number. The first key press is treated as "minus sign". In subsequent key presses, this key functions as numeric 0 key.

CAN Key – The CAN key or the CANcel key is used to cancel the "edit mode" and restore the original value of the data word before entering the "edit mode". CAN key only functions in "edit mode" and has no operation in normal mode.

ENT Key – The ENT key or the ENTer key is used to store the new value of data word to the memory and exit the "edit mode". ENT key only functions in "edit mode" and has no operation in normal mode.

Wiring Diagram



Programming Connector

Connection Parameters:

Baud Rate:	57600
Data Bits:	8 bits
Parity:	None
Stop Bits:	1

Connector Details:

No. of Pins:	9 PIN
Gender:	Female
Type:	D Connector

PIN functions

1. Not connected (NC)
2. TxD – EasyPLC Transmit Data
3. RxD – EasyPLC Receive Data
4. Not Connected (NC)
5. GND – Signal Ground
6. D+ (RS-485 pin A)
7. R – Terminating Resistor Shorting Link 1
8. R – Terminating Resistor Shorting Link 2
9. D- (RS-485 pin B)

Note:

- If terminating resistor is required for RS-485 communication, Short pins 7 and 8 on the D connector externally to connect the terminating resistor in the circuit.
- Use two core 0.5 mm twisted pair for RS-485 communications.
- Currently communications cannot be used from within the PLC program. The communication port is mainly for programming the PLC i.e. for downloading the logic program to the EasyPLC.